CLAIMS

1. An automated material handling and storage system for storing and shipping containers, the system comprising, a structure defining a plurality of cells each cell having a plurality of tier levels and being of a size to cooperatively receive a cargo container in each tier level, a grid track system mounted in spaced relationship above the cells and having tracks extending transversely with respect to one another in an intersecting pattern, at least one transfer unit moveably mounted to the said grid track system so as to be suspended therefrom, said at least one transfer unit including carriage means for suspending said at least one transfer unit from said grid track system, said at least one transfer unit including selectively engageable drive means for moving said at least one transfer unit along said grid track system so as to be moveable in a horizontal plane in both forward to back and side to side motions within the plane, a spreader beam and hoist means carried by said at least one transfer unit for raising and lowering said spreader beam, said spreader beam being of a size to cooperatively engage a storage container within one of said cells, at least one first guide member extending upward from said spreader beam and cooperatively engaging at least one second guide member, said second guide

member extending downwardly from said at least one transfer unit whereby as said spreader beam is elevated above said cells said first and second guide members are engageable to stabilize said spreader beam with respect to said transfer unit, and means for providing electrical power to said at least one transfer unit.

2. The automated material and handling system of claim 1 in which said cells are mounted within a hold of a vessel, said grid track system being mounted above said cells at a vertical height to permit movement of said at least one transfer unit and said spreader beam, and a plurality of deck plates mounted above said grid track system.

3. The automated material and handling and storage system of claim 1 in which said grid track system includes a plurality of rack members extending along each of the tracks of the system, said drive system including at least one drive motor which is powered by said means for providing electrical power to said at least one transfer unit, each of said at least one drive motor being drivingly connected to gears and means for selectively engaging said pinion gears with said rack members.

4. The automated material handing and storage system of claim 3 wherein at least one drive motor drives gears for selectively engaging a first set of tracks extending in an X direction and at least one drive motor to drive gears for selectively engaging racks of tracks extending in a Y direction.

5. The automated material handing and storage system of claim 4 including a plurality of transfer units operatively mounted to said grid track system.

6. The automated material handing and storage system of claim 5 in which said means for moveably supporting each of said plurality of said transfer units includes a plurality of carriage assemblies, each carriage assembly including a plurality of roller elements mounted to a body, said body being of a size to be cooperatively received within a channel defined by each of said tracks of said grid track system, said carriages including a pilot shaft extending downwardly from said body and through an open channel defined in each of said tracks of said grid track system, and means for connecting said pilot shaft to said transfer units to thereby support said transfer units in suspended relationship from said grid track system.

7. The automated material handling and storage system of claim 4 in which one of said first and second guide members includes a fixed probe and the other includes a telescoping probe receiver of a configuration to cooperatively receive said probe so as to prevent swaying or rotational movement of said probe relative to said probe receiver.

8. The automated material handling and storage system of claim 5 including at least one hoist assembly mounted to said transfer units for controlling movement of said spreader beams.

9. The automated material handling and storage system of claim 4 wherein each of said transfer units includes at least one drive motor for driving said transfer units in said X direction and at least one drive motor for driving said transfer units in a Y direction and wherein each of said first and second drive motors includes a substantially similar driving gear configuration for engaging said rack members of said grid track system.

10. The automated material handling and storage system of claim 4 wherein each of said drive gears cooperatively engages at least one driven gear, means for selectively moving said

driven gears relative to said rack members to selectively engage and disengage said driven gears with respect to said rack members.

11. The automated material handling and storage system of claim 10 including guide means positioned between each of said driven gears for cooperatively guiding said driven gears relative to rack members places on opposite sides of a channel defined by said guide tracks of said grid track system.

12. The automated material handling and storage system of claim 4 in which said means for providing energy includes an inductive power raceway mounted adjacent said tracks of said grid track system.

13. The automated material handling and storage system of claim 12 wherein each of said drive motors includes a collector shoe mounted in relationship with respect to said inductive power raceway.

14. A method for handling conventional cargo containers within a hold of a vessel wherein the hold includes a plurality of vertical multi-tiered cells in which the cargo containers are selectively stowed, the method including the

steps of providing a grid track system above the cells of the hold and in spaced relationship with respect thereto so as to define an open space between an upper tier of the cells and the grid track system, providing at least one transfer unit which is moveable along said grid track system in an X-Y direction with respect to a horizontal plane, means for positioning the at least one transfer unit over each of the cells within the hold, the at least one transfer unit including means for selectively elevating cargo containers from each of the cells and moving the cargo containers to an open area or to open tiers within a different cell, and thereafter removing a predetermined container from a cell to be off-loaded from the vessel.

15. The method of claim 14 including the additional step of moving the predetermined container to a predetermined location within a predetermined cell, removing a deck hatch covering said predetermined cell and thereafter elevating said predetermined container from said predetermined location to above a deck of the vessel.

16. The method of claim 15 including spacing through the grid track system whereby the said predetermined container can pass vertically through the grid track system.

17. The method of claim 14 including providing a plurality of transfer units each moving independently within said grid track system and manipulating a plurality of predetermined containers simultaneously within the open space.